

REMARKS

Claim 4 was rejected under § 112, first paragraph. Claim 4 is canceled without prejudice to reentry, and the rejection is moot.

Claims 1-3 were rejected under § 102 as anticipated by Kains '545, which rejection is respectfully traversed. Claim 1 as amended recites that

... the control device controls the gear drive device based on a second assist value which comprises a sum of [1] a differential value of the output signal of the torque detecting device and [2] a first principal assist current value which is provided based on the detection signal of the torque detecting device.

This feature is disclosed in the specification, starting with the last paragraph on page 8, and Fig. 11. Fig. 11 shows that the torque sensor 35 outputs an electric signal which is proportional to the torque applied to the steering wheel by the pilot; this signal goes to two units 50a and 50b. Unit 50a converts the raw torque signal to a “principal assist current,” according to a look-up-table function (shown in Fig. 12; see text spanning pp. 8-9). Meanwhile, unit 50b converts the raw torque signal to an “auxiliary assist current,” by differentiating it (page 9, lines 9-11). The principal and auxiliary assist currents are added in an “assist current determination means” 50c, and their sum is called the “second principal assist current.” This is the current that controls the motor 27 which is coupled to the gear drive (page 10, second full paragraph).

The claimed arrangement increases the responsiveness, by decreases the steering time delay (last paragraph on page 9). As can be seen in Fig. 12, the principal assist contributes very little boost while a small torque is applied by the pilot. Delay occurs because the steering wheel

must be turned through a certain angle before any torque is developed. However, in the case of an “abrupt change” (page 10, line 3), the differential control causes an improved response. The claimed arrangement also suppresses oscillation (page 10, first full paragraph).

Kains does not disclose the new feature. Kains' sensor 34 detects torque (col. 3, line 61) and its torque-signal is converted to a pulse-width-modulation signal that is “in proportion” to the torque, so that the steering assist of the motor is also in proportion (col. 3, line 66 to col. 4, line 13). The assist is a direct amplification of the torque, and there is no mention in this reference of differentiating the torque, nor of adding two different signals derived from the torque.

Withdrawal of the rejection is requested.

Respectfully submitted,

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Date


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